

PATENT APPLICATION  
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LeA 36,396

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICATION OF	)	GROUP NO.: 1796
CHRISTOPH GÜRTLER ET AL	)	)
SERIAL NUMBER: 10/784,018	)	EXAMINER:
FILED: FEBRUARY 20, 2004	)	) BENJAMIN GILLESPIE
TITLE: POLYURETHANE COATING	)	) CONFIRMATION NO.: 2512
SYSTEMS	)	)

**REVISED APPEAL BRIEF**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Revised Appeal Brief is submitted in Response to the Notification of Non-Compliant Appeal Brief dated November 25, 2008.

**I. REAL PARTY IN INTEREST**

Each of the inventors has assigned his interest in the present application to Bayer MaterialScience AG, a German corporation. Bayer MaterialScience AG is therefore the real party in interest in this Appeal.

**II. RELATED APPEALS AND INTERFERENCES**

There are no prior or pending appeals, interferences or judicial proceedings which are related to, affected by or have a bearing on the Board's decision in this Appeal.

**III. STATUS OF CLAIMS**

A. Claims 1, 3, 5-8, 14-18, 22-24 and 29-37 stand rejected and are the subject of this Appeal.

- B. Claims 2, 4, 9-13, 19-21 and 25-28 were cancelled in the Amendment filed February 27, 2006.
- C. No claims have been withdrawn from consideration.
- D. No claims have been objected to.
- E. No claims have been allowed.

IV. STATUS OF AMENDMENTS

No amendments to the claims have been made or requested subsequent to the Final Action of the Examiner.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention is directed to polyurethane-based one-component baking systems (independent Claim 1) (page 1, line 8 of the specification), processes for their production (Claims 22, 23, and 24)(page 1, lines 8-9 of the specification), a method of preparing paints, inks and adhesives from these systems (Claim 14) (page 1, line 9 of the specification) and substrates coated with coatings made with these baking systems (Claim 15).

The systems of the present invention (independent Claim 1) include blocked isocyanates (page 7, line 26 of the specification) , polymers having isocyanate-reactive groups (page 7, line 27 of the specification), at least one molybdenum and/or tungsten-containing compound having an oxidation state of at least +4 (page 7, lines 28-30 of the specification), and water and/or organic solvents (page 7, line 31 of the specification). The blocked isocyanates plus polymers having isocyanate-reactive groups are present in an amount totaling from 20 to 89.9 parts by weight (page 8, line 3 of the specification), the tungsten and/or molybdenum catalyst is present in an amount of from 0.01 to 5 parts by weight (page 8, lines 3-4 of the specification), from 10 to 70 parts by weight of water and/or solvent (page 8, line 4 of the specification) are present and up to 10 parts by weight of additives and auxiliaries (page 8, lines 4-5 of the specification). The tungsten and/or molybdenum-containing compound must be selected from ammonium molybdate, lithium molybdate, sodium molybdate, potassium molybdate, rubidium molybdate,

caesium molybdate, ammonium paramolybdate  $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4 \text{ H}_2\text{O}$ , molybdenyl bisacetylacetone MoO<sub>2</sub>(C<sub>5</sub>H<sub>7</sub>O<sub>5</sub>)<sub>2</sub>, molybdenum dioxide tetramethylheptadionate MoO<sub>2</sub>(TMHD)<sub>2</sub>, molybdenum alkoxides formed from 1,2-, 1,3- or 1,4-diols such as ethylene glycol, propylene glycol or 1,4-butanediol-molybdic acid, molybdenum oxides, tetraethylammonium molybdate, sodium tungstate, magnesium molybdate, lithium tungstate and phosphotungstic acid. (page 18, lines 5-14 of the specification)

In the method for preparing paints, inks, and adhesives of the present invention (Claim 14), one or more materials selected from the group of pigments (page 6, line 16 of the specification), fillers (page 6, line 16 of the specification), levelling agents (page 6, line 16 of the specification), defoamers (page 6, line 17 of the specification), catalysts other than organic and/or inorganic compounds of molybdenum and/or of tungsten (page 6, lines 17-18 of the specification), and mixtures thereof (page 6, line 18 of the specification) is/are added (page 6, line 15 of the specification) to the above-described system (page 6, line 15 of the specification) of Claim 1.

The coated substrates of the present invention (Claim 15) are coated with coatings obtained from the above-described systems of Claim 1. (Page 21, lines 1-3 of the specification)

In the process for preparing the systems of the present invention (Claim 22), component (c)(i.e., the molybdenum and/or tungsten compound) is introduced into components (a)(i.e., the blocked polyisocyanates) and/or (b)(i.e., polymers having isocyanate-reactive groups) (page 6, lines 1-4 of the specification) prior to dispersing or dissolving components (a) and/or (b) in component (d)(i.e., the water and/or solvent) (page 6, lines 4-5 of the specification).

In the process for preparing the systems of the present invention (Claim 23) component (c) (i.e., the molybdenum and/or tungsten compound) is introduced into component (d) (i.e., the water and/or solvent) (page 6, lines 5-7 of the specification) prior to dispersing or dissolving component (a) (i.e., the blocked polyisocyanates) and/or (b) (i.e., polymers having isocyanate-reactive groups) in component (d) (i.e., the water and/or solvent) (page 6, lines 7-8 of the specification).

In the process for preparing the aqueous or water-dispersible systems of the present invention (Claim 24).component (c) (i.e., the molybdenum and/or tungsten

compound) is added to one or more of component (a) (i.e., the blocked polyisocyanates), component (b) (i.e., polymers having isocyanate-reactive groups), and organic solvents or solvent mixtures (d) (page 6, lines 8-12 of the specification) before adding dispersing water (d) (page 6, line 12 of the specification).

**VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

A. Claims 1, 3, 5-8, 14-18, 22-24, and 29-37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Watanabe et al (2003/0096103) in view of Yagii et al (U.S. Patent 5,138,015).

**VII. ARGUMENTS**

A. Neither Watanabe et al nor Yagii et al teaches or suggests use of the molybdenum and/or tungsten compounds required by Appellants' claims in a polyurethane-forming system.

Watanabe et al discloses a coated metal plate which comprises a metal plate laminated on at least one surface with a conductive plastic coated film and an electrodeposition coated film. The conductive plastic coated film may be any plastic film provided with a conductivity. Not one of the conductive substances disclosed by Watanabe et al is a tungsten or molybdenum compound selected from the group of tungsten and/or molybdenum compounds required by Appellants' claims.

Watanabe et al also discloses an electrodeposition coated film on the surface of the conductive plastic film. This electrodeposition coated film can be prepared by blending (i) a base resin having a hydroxyl group and an amino group which can be converted to cation and (ii) a curing agent such as a blocked polyisocyanate, neutralizing a cationic group in the base resin with an acid, and then mixing with water. A curing catalyst having corrosion resistance may be included.

Watanabe et al teaches electrodeposited coating surfaces - not one-component baked systems such as those being claimed by Appellants. The teachings of Watanabe et al can not therefore be construed in any manner which would lead one skilled in the art to a one-component baking system that includes any of the specific molybdenum and/or tungsten compounds required by Appellants' claims.

Further, Watanabe et al teaches in its examples that the metal plate is coated by electrodeposition after being dipped in a cationic electrodeposition paint, subjected to a selected voltage and then heated to 170°C.

There is no teaching in Watanabe et al of any catalyst within the scope of Appellants' claimed invention. Nor is there any teaching in Watanabe et al which would lead one skilled in the art to use a catalyst which is not even mentioned by Watanabe et al with the expectation of obtaining a coating which can be cured at temperatures below 160°C.

Appellants' claimed one-component baking systems are cured by baking at temperatures in the range of 90-160°C. (See page 20, lines 24-25 of the specification.) Appellants' claimed systems are not therefore taught or suggested by Watanabe et al.

Yagii et al discloses a process for producing polyurethanes useful as coatings having reduced levels of chlorine because the isocyanate used to produce the reference polyurethane was prepared in the absence of phosgene.

Yagii et al is cited for its teaching that any of the known catalysts for the thermal **decomposition** of a urethane such as that which Yagii et al prepare by reacting a dialkyl carbonate with a diamine. Among these known catalysts are metallic manganese and manganese compounds, metallic molybdenum and molybdenum compounds, metallic tungsten and tungsten compounds and "most other catalysts which are generally used in the thermal decomposition of urethane." (column 9, lines 56-58)

Yagii et al does not teach or suggest anything with respect to one component baked coating systems. In fact, the teaching for which Yagii et al is cited is directed to the production of an isocyanate, i.e., a process for producing a **starting material** for the blocked polyisocyanates employed in the coating systems of Applicants' invention - not the coating system of Applicants' claims.

The Examiner has conceded that Watanabe et al fails to teach the specific molybdenum and tungsten catalyst compounds required by Appellants' claims.

Yagii et al teaches that catalysts such as those required by Appellants' claims are suitable for **breaking down** a polyurethane rather than **forming** a polyurethane. Appellants are, however, claiming systems which **form** a polyurethane.

Yagii et al teaches a large number of catalysts which are suitable for use in converting the disclosed diisocyanates to polyurethanes. However, **not a single molybdenum or tungsten** compound is taught to be suitable for this conversion. This "omission" of tungsten and molybdenum compounds is particularly significant in view of Yagii et al's teaching that molybdenum and tungsten compounds were suitable catalysts for the decomposition of polyurethanes. One skilled in the art reading the teachings of Yagii et al at the time Appellants made their invention would not therefore consider it obvious to use or even obvious to try molybdenum and/or tungsten compounds as a catalyst in the polyurethane-forming reaction mixture.

In short, Watanabe et al does not teach or suggest the tungsten and/or molybdenum catalyst compounds required by Appellants' claims and Yagii et al teaches that tungsten and/or molybdenum compounds are suitable for decomposing polyurethane but **not** for producing polyurethanes.

One skilled in the art reading seeking to produce these disclosures at the time Appellants made their invention would not therefore consider it "obvious" to include the molybdenum and/or tungsten compounds required in Appellants' claimed invention in a polyurethane-based baking system.

The combined teachings of Watanabe et al and Yagii et al do not therefore render Appellants' claimed invention obvious.

B. Yagii et al, the only reference which even mentions molybdenum and/or tungsten compounds of the type required in Appellants' claimed invention, does not teach or suggest that use of such catalyst will result in a coating system which may be cured at temperatures of from 90 to 160°C.

Yagii et al does not teach or suggest anything with respect to a baked coating system. Yagii et al does not teach or suggest the use of a tungsten and/or molybdenum compound in polyurethane-based one component baking system. Yagii et al does not teach or suggest that use of a molybdenum and/or tungsten compound in polyurethane-based one-component baking system would make it possible to cure that baking system at temperatures of from 90 to 160°C.

The teachings of Yagii et al do not therefore "supply" the teachings "missing" from the teachings of Watanabe et al with respect to the molybdenum and/or tungsten compounds required for Appellants' claimed invention.

The combined teachings of Watanabe et al and Yagii et al do not therefore render Appellants' claimed invention obvious.

VIII. CONCLUSION

A rejection under 35 U.S.C. §103(a) must have a factual basis.

Neither Watanabe et al nor Yagii et al teaches or suggests use of the molybdenum and/or tungsten catalysts required for Appellants' claimed systems in a polyurethane-forming system.

In fact, Yagii et al's teaching with respect to the usefulness of such tungsten and/or molybdenum catalysts to decompose polyurethanes to form polyisocyanates would lead one skilled in the art away from using these materials in a polyurethane-forming system of the type being claimed by Appellants.

The teachings of Watanabe et al and Yagii et al can not therefore be properly combined in a manner which would render Appellants' claimed invention obvious to one of ordinary skill in the art at the time Appellants made their invention.

Appellants therefore maintain that the Examiner's rejection is in error and respectfully request that this rejection be reversed and that Claims 1, 3, 5-8, 14-18, 22-24, and 29-37 be allowed.

Respectfully submitted,

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IX. CLAIMS APPENDIX

1. Polyurethane-based one-component baking systems comprising
  - (a) blocked polyisocyanates,
  - (b) polymers having isocyanate-reactive groups,
  - (c) one or more organic and/or inorganic compounds of molybdenum and/or of tungsten in which the molybdenum and/or tungsten has an oxidation state of at least + 4 and which comprise a member selected from the group consisting of ammonium molybdate, lithium molybdate, sodium molybdate, potassium molybdate, rubidium molybdate, caesium molybdate, ammonium paramolybdate  $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4 \text{ H}_2\text{O}$ , molybdenyl bisacetylacetone  $\text{MoO}_2(\text{C}_5\text{H}_7\text{O}_5)_2$ , molybdenum dioxide tetramethylheptadionate  $\text{MoO}_2(\text{TMHD})_2$ , molybdenum alkoxides formed from 1,2-, 1,3- or 1,4-diols such as ethylene glycol, propylene glycol or 1,4-butanediol-molybdic acid, molybdenum oxides, tetraethylammonium molybdate, sodium tungstate, magnesium molybdate, lithium tungstate and phosphotungstic acid,
  - (d) water and/or organic solvents or solvent mixtures and
  - (e) optionally further additives and auxiliaries,

wherein the amounts of (a) + (b) are from 20 to 89.9 parts by weight, (c) is from 0.01 to 5 parts by weight, (d) is from 10 to 70 parts by weight and (e) is from 0 to 10 parts by weight and the sum of the parts by weight of components (a) to (e) is 100.

3. The systems according to Claim 1, wherein the compounds of molybdenum and/or of tungsten comprise a member selected from the group consisting of ammonium molybdate, lithium molybdate, sodium molybdate, potassium molybdate, rubidium molybdate, caesium molybdate, ammonium paramolybdate  $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4 \text{ H}_2\text{O}$ , molybdenyl bisacetylacetone  $\text{MoO}_2(\text{C}_5\text{H}_7\text{O}_5)_2$ , molybdenum dioxide tetramethylheptadionate  $\text{MoO}_2(\text{TMHD})_2$ , molybdenum alkoxides formed from 1,2-, 1,3- or 1,4-diols such as ethylene glycol, propylene glycol or 1,4-butanediol-molybdic acid, molybdenum oxides, tetraethylammonium molybdate and sodium tungstate.

5. The systems according to Claim 1, wherein blocked polyisocyanates (a) comprise aliphatic isocyanates.
6. The systems according to Claim 1, wherein blocked polyisocyanates (a) comprise aromatic isocyanates.
7. The systems according to Claim 1, wherein blocked polyisocyanates (a) comprise polyisocyanates based on hexamethylene diisocyanate, isophorone diisocyanate, 4,4'-diisocyanatodicyclohexylmethane, their derivatives and/or mixtures.
8. The systems according to Claim 1, wherein blocked polyisocyanates (a) are hydrophilic.
14. A method of preparing paints, inks and adhesives comprising adding to the systems according to Claim 1, one or more materials selected from the group consisting of pigments, fillers, levelling agents, defoamers, catalysts other than organic and/or inorganic compounds of molybdenum and/or of tungsten, and mixtures thereof.
15. Substrates coated with coatings obtained from the systems according to Claim 1.
16. The systems according to Claim 1, wherein blocked polyisocyanates (a) are hydrophilic and comprise aliphatic isocyanates.
17. The systems according to Claim 1, wherein blocked polyisocyanates (a) are hydrophilic and comprise aromatic isocyanates.
18. The systems according to Claim 1, wherein blocked polyisocyanates (a) are hydrophilic and comprise polyisocyanates based on hexamethylene diisocyanate, isophorone diisocyanate, 4,4'-diisocyanatodicyclohexylmethane, their derivatives and/or mixtures.

22. A process for preparing the systems according to Claim 1 comprising introducing component (c) into components (a) and/or (b) prior to dispersing or dissolving components (a) and/or (b) in component (d).

23. A process for preparing the systems according to Claim 1 comprising introducing component (c) into component (d) prior to dispersing or dissolving component (a) and/or (b) in component (d).

24. A process for preparing aqueous or water-dispersible systems according to Claim 1 comprising adding component (c) to one or more of component (a), component (b), and organic solvents or solvent mixtures (d) before adding dispersing water (d).

29. The systems according to Claim 1 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

30. The systems according to Claim 3 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

31. The systems according to Claim 5 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

32. The systems according to Claim 6 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

33. The systems according to Claim 7 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

34. The systems according to Claim 8 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

35. The systems according to Claim 16 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

36. The systems according to Claim 17 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

37. The systems according to Claim 18 wherein polymers b) having isocyanate-reactive groups comprise a member selected from the group consisting of polyhydroxy polyesters, polyhydroxy polyethers and hydroxyl-containing addition polymers.

X. EVIDENCE APPENDIX

None

XI. RELATED PROCEEDINGS APPENDIX

None